

# Ecological site PX138X00Y090

## Loamy and Clayey Depression Bottomland Forests

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### General information

**Provisional.** A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

### MLRA notes

Major Land Resource Area (MLRA): 138X–North-Central Florida Ridge

The MLRA notes section provides a brief description of the entire MLRA. This description is intended to provide some context about the MLRA within which this ecological site is associated. A more complete description of the MLRA can be found in Ag Handbook 296 (USDA-NRCS, 2022). This MLRA is on a limestone upland that is mantled with sandy marine deposits and has an irregular, gently rolling topography. Because of the underlying karst topography, there are a moderate number of limestone sinkholes, some filled with water. Production of cash crops, hay, and pasture is the primary land use. This area comprises about 2,196 square miles (5,688 square kilometers) and is entirely within Florida. This area is underlain by sediments of the Quaternary Period (present to 2.58 million years ago) that overlie the Neogene (2.53 to 23.03 million years ago) and Paleogene (23.03 to 66 million years ago) formations of the Hawthorn Group (Green et al., 2006). The rocks are progressively older to the south. The Quaternary sediments are largely undifferentiated marine deposits consisting of fine to coarse sands that are poorly to moderately sorted with variable mixtures of clay and organic material. The formations of the Hawthorn Group are, from youngest to oldest, the Statesville Formation, Coosawhatchie Formation, Suwannee Limestone, and Ocala Limestone. The Statesville Formation consists of thinly interbedded, and commonly cross-bedded, dolostone and clay alternating with beds of sand. Phosphate grains are common to abundant. The Coosawhatchie Formation is made up of poorly to moderately sorted sandy clay or clayey sand with phosphate grains, limestone, and dolostone. The Suwannee Limestone is a cream colored to tan, crystalline, vuggy and muddy, fossiliferous, variably dolomitic carbonate. It has chert nodules in some areas. The Ocala Limestone was deposited in the Eocene (33.9 to 56 million years ago) and is the oldest rock formation exposed in Florida. It is a white to cream-colored, fossiliferous limestone and has chert nodules in some areas. This area borders MLRA 133A to the north, which has only slight differences in use and management due to the underlying karst topography. Its boundaries with MLRA 152A to the west and MLRA 153A to the east are distinguishable by an abrupt scarp on a lower, younger marine terrace. Its boundary with MLRA 154 is a gradual transition to slightly younger marine sediments to the south. Elevation of the MLRA ranges from 26 to 197 feet (8 to 60 meters). Local relief is generally 10 to 20 feet (3 to 6 meters) but can be as much as 35 feet (10 meters). The dominant soil orders are Ultisols, Entisols, and Alfisols. The soils in the area dominantly have a thermic temperature regime, a udic moisture regime, and siliceous mineralogy. This area supports open pine and oak vegetation. Major wildlife species include white-tailed deer, raccoon, skunk, opossum, rabbit, gray squirrel, fox squirrel, turkey, bobwhite quail, and mourning dove. The abundant rainfall and the Floridan aquifer are the principal sources of water in the area. The many lakes and ponds are used for recreation. Most of the river water is suitable for almost all uses. Shallow and deep wells in the Floridan aquifer provide water for public supply, domestic use, industry, mining, livestock, and irrigation. This aquifer is one of the most productive sources of ground water in the United States. Its water is hard but of good quality. Wells yield large quantities of the calciumbicarbonate type of water. The Floridan aquifer is a thick sequence of Tertiary limestone and dolomite. The Eocene Avon Park Formation and Ocala Limestone are the thickest and most productive units in the aquifer system. A significant portion of this MLRA along riparian areas remains wooded with some larger holdings used exclusively for forestry. Pulpwood and lumber are the principal forest products. Hay and pasture are of great extent throughout this MLRA. The cropland in the area is used mainly for corn, peanuts, tobacco, soybeans, vegetables, and melons. The major resource concerns are maintenance of organic matter and productivity of the soils, management of soil moisture, and management of animal waste. Conservation practices on cropland generally include crop rotations, cover crops, nutrient management, pest management, and irrigation water management. (USDA, NRCS, 2022)

### Classification relationships

Most of this area is in the East Gulf Coastal Plain section of the Coastal Plain province of the Atlantic Plain. The southern one-quarter is in the Floridian section of the same province and division. (McNab et al., 2007; USDA, NRCS, 2022) MLRA 138 is relatively small and comprises the eastern half of EPA level IV ecoregion 65o, Tallahassee Hills and Valdosta Limesink, which is part of level III ecoregion 65, Southeastern Plains. (U.S. EPA, 2013) The reference community of this site corresponds approximately with the Bottomland Forest community (FNAI, 2010). The improved pasture community of the managed grassland state corresponds well with Forage Suitability Group G138XA345FL. The improved drained pasture community corresponds well with Forage Suitability Group G138XA341FL. (USDA, NRCS, 2013)

## Ecological site concept

This site is on very poorly drained soils in closed depressions where the dominant hydrology is occasional to frequent ponding. The land is flat with slopes mostly from 0 to 2 percent. Soils are mostly loamy and clayey, and have an argillic horizon within 20 inches. Some soils may have a mollic or umbric horizon. This site often supports Bottomland Forest, Coniferous Plantation, and Improved Pasture communities.

## Associated sites

|              |                                                                                                                                                                          |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PX138X00Y070 | <b>Sandy Depression Basin and Dome Swamps</b><br><br>These soils are in a similar landscape position but have different physical properties and productivity.            |
| PX138X00Y080 | <b>Sandy Over Loamy Depression Basin and Dome Swamps</b><br><br>These soils are in a similar landscape position but have different physical properties and productivity. |

## Similar sites

|              |                                                                                                                                                                                                                       |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PX138X00Y060 | <b>Loamy and Clayey Bottomland Forests on Stream Terraces</b><br><br>These sites support similar native vegetation communities, but production is somewhat different, especially regarding grazing forage production. |
| PX138X00Y120 | <b>Loamy and Clayey Lowland Flats</b><br><br>These sites support similar native vegetation communities, but production is somewhat different, especially regarding grazing forage production.                         |

Table 1. Dominant plant species

|            |                                                              |
|------------|--------------------------------------------------------------|
| Tree       | (1) <i>Liquidambar styraciflua</i><br>(2) <i>Pinus taeda</i> |
| Shrub      | Not specified                                                |
| Herbaceous | Not specified                                                |

## Legacy ID

F138XY090AL

## Physiographic features

This site occurs in landscape positions that are not along major rivers and stream, or if it does occur near major rivers and streams it is not influenced by regular flooding events, even in the absence of water control structures. This site occurs in closed depressions. Dominant hydrology on this site is typically ponding. Slope is typically 0 to 2 percent.

Table 2. Representative physiographic features

|           |                                 |
|-----------|---------------------------------|
| Landforms | (1) Marine terrace > Depression |
|-----------|---------------------------------|

|                    |                                    |
|--------------------|------------------------------------|
| Runoff class       | Negligible                         |
| Flooding frequency | None                               |
| Ponding duration   | Long (7 to 30 days)                |
| Ponding frequency  | None to frequent                   |
| Elevation          | 10 – 60 m                          |
| Slope              | 0 %                                |
| Ponding depth      | 0 cm                               |
| Water table depth  | 0 – 50 cm                          |
| Aspect             | Aspect is not a significant factor |

**Table 3. Representative physiographic features (actual ranges)**

|                    |                     |
|--------------------|---------------------|
| Runoff class       | Negligible          |
| Flooding frequency | None                |
| Ponding duration   | Long (7 to 30 days) |
| Ponding frequency  | None to frequent    |
| Elevation          | 10 – 60 m           |
| Slope              | 0 %                 |
| Ponding depth      | 60 cm               |
| Water table depth  | 0 – 50 cm           |

### **Climatic features**

The maximum precipitation occurs in summer, and the minimum occurs in winter and late autumn. Rainfall occurs during high-intensity, convective thunderstorms in summer. The average annual temperature is 68 to 69 degrees F (20 to 21 degrees C).

An additional hazard of concern during late summer through early fall are tropical cyclones. While most impacts from hurricanes and tropical storms are confined along the coastal zone, heavy rainfall, severe flooding, and high winds can occur well into Florida when such systems pass through the area. To the extreme, the region is susceptible to the effects of a strong Bermuda High during the summer, which can cause devastating drought conditions for weeks and even months in some years.

(USDA, NRCS, 2022)

Table 4 Representative climatic features

|                                            |                |
|--------------------------------------------|----------------|
| Frost-free period (characteristic range)   | 220-230 days   |
| Freeze-free period (characteristic range)  | 250-260 days   |
| Precipitation total (characteristic range) | 1,320-1,370 mm |
| Frost-free period (actual range)           | 210-230 days   |
| Freeze-free period (actual range)          | 240-270 days   |
| Precipitation total (actual range)         | 1,320-1,370 mm |
| Frost-free period (average)                | 220 days       |
| Freeze-free period (average)               | 260 days       |
| Precipitation total (average)              | 1,350 mm       |

- (1) JASPER [USC00084394], Jasper, FL
- (2) LIVE OAK [USC00085099], Live Oak, FL
- (3) MAYO [USC00085539], Live Oak, FL
- (4) LAKE CITY 2 E [USC00084731], Lake City, FL
- (5) HIGH SPRINGS [USC00083956], High Springs, FL
- (6) BELL 4NW [USC00080598], Old Town, FL

**Influencing water features**

The Suwannee River, which originates in the Okefenokee Swamp to the northeast and is spring-fed, flows through this MLRA. The Alapaha and Withlacoochee Rivers join the Suwannee River in the area. Another Suwannee River tributary, the Santa Fe River, crosses the southern part of the area. (USDA, NRCS, 2022)

**Wetland description**

Dominant hydrology on this site is ponding. This site is very poorly drained. It represents locations where the soils may or may not meet hydric field criteria, and the variation between the two may be exceptionally subtle. In situations where the soil is hydric, this site represents locations that are seasonally saturated and/or ponded, are not typically flooded, and are not exposed to tidal influences, so any wetlands that occur on this site are palustrine in nature.

**Soil features**

Please note that the soils listed in this section of the description may not be all inclusive. There may be additional soils that fit the site's concepts. Additionally, the soils that provisionally form the concepts of this site may occur elsewhere, either within or outside of the MLRA and may or may not have the same geomorphic characteristics or support similar vegetation. Some soil map units and soil series included in this "provisional" ecological site were used as a "best fit" for a particular soil – landform catena during a specific era of soil mapping, regardless of the origin of parent material or the location of MLRA boundaries. Therefore, the listed soils may not be typical for MLRA 138 or a specific location, and the associated soil map units may warrant further investigation in a joint ecological site inventory – soil survey project. When utilizing this provisional description, the user is encouraged to verify that the area of interest meets the appropriate ecological site concepts by reviewing the soils, landform, vegetation, and physical location. If the site concepts do not match the attributes of the area of interest, please review the Similar or Associated Sites listed in the General Information section of this description to determine if another site may be a better fit for your area of interest.

This site is comprised of soils in the Pantego series. These soils are very poorly drained, loamy or clayey, and they have an argillic horizon within 20 inches. Some soils may have a mollic or umbric horizon.

**Table 5. Representative soil features**

|                                                          |                     |
|----------------------------------------------------------|---------------------|
| Parent material                                          | (1) Marine deposits |
| Surface texture                                          | (1) Fine sandy loam |
| Drainage class                                           | Very poorly drained |
| Permeability class                                       | Moderately rapid    |
| Soil depth                                               | 200 cm              |
| Surface fragment cover <=3"                              | Not specified       |
| Surface fragment cover >3"                               | Not specified       |
| Available water capacity<br>(0-101.6cm)                  | 11.18 – 20.07 cm    |
| Soil reaction (1:1 water)<br>(0-25.4cm)                  | 3.5 – 5.5           |
| Subsurface fragment volume <=3"<br>(Depth not specified) | Not specified       |
| Subsurface fragment volume >3"<br>(Depth not specified)  | Not specified       |

**Table 6. Representative soil features (actual values)**

|                                                          |                     |
|----------------------------------------------------------|---------------------|
| Drainage class                                           | Very poorly drained |
| Permeability class                                       | Moderately rapid    |
| Soil depth                                               | 200 cm              |
| Surface fragment cover <=3"                              | 0 %                 |
| Surface fragment cover >3"                               | 0 %                 |
| Available water capacity<br>(0-101.6cm)                  | 11.18 – 20.07 cm    |
| Soil reaction (1:1 water)<br>(0-25.4cm)                  | 3.5 – 5.5           |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 0 %                 |
| Subsurface fragment volume >3"<br>(Depth not specified)  | 0 %                 |

## Ecological dynamics

The information presented in this ecological site description (ESD) and state-and-transition model (STM) were developed using archaeological and historical information, published and unpublished scientific reports, professional experience, consultation with technical experts, and NRCS inventories and studies. The information presented represents a complex set of plant community dynamics and environmental variables. Not all scenarios or plants are represented and included. Key indicator plants, animals, and ecological processes are described to help guide land management decisions and actions.

The complex topography formed by alluvial rivers and some larger blackwater rivers such as the Suwannee River creates a mixture of bottomland forest and more frequently flooded alluvial forest and flood plain swamp. Bottomland forest vegetation may be found not only on higher terraces within the flood plain, but also on natural levees and ridges. Levees are formed during high floods when water from the main channel overtops the banks. As flood waters are slowed by the process of spreading across the flood plain surface, sand and other heavy sediments are the first to be deposited along these ridges, and thus levees are gradually built upward. Along oxbows that have become isolated from the main channel, levees persist as high ridges. In some cases, these levees and ridges may be quite dry and support upland communities such as mesic or xeric hammock. Bottomland forest, while not as prone to prolonged growing season inundations as alluvial forest, is nevertheless influenced by high water tables and peak seasonal flooding as well as irregular high flood events. Variations in seedling establishment are often caused not only by flooding regimes, but also by windthrows and treefall gaps that allow for the establishment of shade intolerant species. Organic debris from bottomland forests is an important nutrient source for downstream ecosystems. Although annual floods do not always inundate bottomland forest, large scale patterns of high water pulses occur periodically and are correlated with a significant increase in commercial fish abundance in their outlet bay. Fire is not a significant factor in bottomland forest, and is primarily limited to individual trees affected by lightning strikes. (FNAI, 2010)

Following this narrative, a "provisional" state and transition model is provided that includes the "perceived" reference state and several alternative (or altered) vegetation states that have been observed and/or projected for this ecological site. This model is based on limited inventories, literature, expert knowledge, and interpretations. Plant communities may differ from one location to the next depending on the

severity of local land use activities and rates of deposition. Depending on objectives, the reference plant community may not necessarily be the management goal.

The environmental and biological characteristics of this site are complex and dynamic. As such, the following diagram suggests pathways that the vegetation on this site might take, given that the modal concepts of climate and soils are met within an area of interest. Specific locations with unique soils and disturbance histories may have alternate pathways that are not represented in the model. This information is intended to show the possibilities within a given set of circumstances and represents the initial steps toward developing a defensible description and model. The model and associated information are subject to change as knowledge increases and new information is garnered. This is an iterative process. Most importantly, local and/or state professional guidance should always be sought before pursuing a treatment scenario.

## State and transition model

### Additional community tables

Table 7. Community 1.1 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 8. Community 1.2 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 9. Community 1.3 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 10. Community 1.4 plant community composition

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

Table 11. Community 2.1 plant community composition

| Group                  | Common Name       | Symbol | Scientific Name               | Annual Production () | Foliar Cover (%) |
|------------------------|-------------------|--------|-------------------------------|----------------------|------------------|
| <b>Grass/Grasslike</b> |                   |        |                               |                      |                  |
| 1                      | <b>Graminoids</b> |        |                               | 2354-14571           |                  |
|                        | limpograss        | HEAL5  | <i>Hemarthria altissima</i>   | 8967-14571           | –                |
|                        | maidencane        | PAHE2  | <i>Panicum hemitomon</i>      | 5604-7510            | –                |
|                        | Japanese millet   | ECES   | <i>Echinochloa esculenta</i>  | 4483-6725            | –                |
|                        | blue maidencane   | AMPU6  | <i>Amphicarpum purshii</i>    | 2354-2802            | –                |
| <b>Forb</b>            |                   |        |                               |                      |                  |
| 2                      | <b>Legumes</b>    |        |                               | 2242-3363            |                  |
|                        | shyleaf           | AEAM   | <i>Aeschynomene americana</i> | 2242-3363            | –                |

Table 12. Community 2.2 plant community composition

| Group                  | Common Name       | Symbol | Scientific Name               | Annual Production () | Foliar Cover (%) |
|------------------------|-------------------|--------|-------------------------------|----------------------|------------------|
| <b>Grass/Grasslike</b> |                   |        |                               |                      |                  |
| 1                      | <b>Graminoids</b> |        |                               | 1009-15692           |                  |
|                        | Bermudagrass      | CYDA   | <i>Cynodon dactylon</i>       | 14011-15692          | –                |
|                        | limpograss        | HEAL5  | <i>Hemarthria altissima</i>   | 11208-14571          | –                |
|                        | pearl millet      | PEGL2  | <i>Pennisetum glaucum</i>     | 8406-13450           | –                |
|                        | eastern gamagrass | TRDA3  | <i>Tripsacum dactyloides</i>  | 4483-7566            | –                |
|                        | bahiagrass        | PANO2  | <i>Paspalum notatum</i>       | 4203-6725            | –                |
|                        | big bluestem      | ANGE   | <i>Andropogon gerardii</i>    | 1009-2018            | –                |
| <b>Forb</b>            |                   |        |                               |                      |                  |
| 2                      | <b>Legumes</b>    |        |                               | 2802-3363            |                  |
|                        | shyleaf           | AEAM   | <i>Aeschynomene americana</i> | 2802-3363            | –                |

|  |              |      |                           |           |   |
|--|--------------|------|---------------------------|-----------|---|
|  | hairy indigo | INHI | <i>Indigofera hirsuta</i> | 2802-3363 | – |
|--|--------------|------|---------------------------|-----------|---|

**Table 13. Community 2.3 plant community composition**

| Group | Common Name | Symbol | Scientific Name | Annual Production () | Foliar Cover (%) |
|-------|-------------|--------|-----------------|----------------------|------------------|
|-------|-------------|--------|-----------------|----------------------|------------------|

## Inventory data references

Data collection and analysis of field data will be performed during the Verification Stage of ESD development. Production data for pasture communities taken from the USDA, NRCS Florida Field Office Technical Guide, forage suitability groups (USDA, NRCS, 2013).

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## Approval

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## Rangeland health reference sheet

**Interpreting Indicators of Rangeland Health** is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

|                                             |                   |
|---------------------------------------------|-------------------|
| Author(s)/participant(s)                    |                   |
| Contact for lead author                     |                   |
| Date                                        | 10/06/2026        |
| Approved by                                 |                   |
| Approval date                               |                   |
| Composition (Indicators 10 and 12) based on | Annual Production |

### Indicators

**1. Number and extent of rills:**

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**2. Presence of water flow patterns:**

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**3. Number and height of erosional pedestals or terracettes:**

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**4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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**5. Number of gullies and erosion associated with gullies:**

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**6. Extent of wind scoured, blowouts and/or depositional areas:**

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**7. Amount of litter movement (describe size and distance expected to travel):**

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8. Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):

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9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):

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10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:

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11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):

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12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):

Dominant:

Sub-dominant:

Other:

Additional:

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13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):

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14. Average percent litter cover (%) and depth ( in):

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15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):

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16. Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:

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17. Perennial plant reproductive capability:

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